EPA/ROD/R05-93/244
1993

EPA Superfund
Record of Decision:

POWELL ROAD LANDFILL
EPA ID: OHD000382663
OU 01
DAYTON, OH
09/30/1993

DECLARATION FOR THE RECORD OF DECISION

SITE NAME AND LOCATION

Powell Road Landfill
Huber Heights, Ohio

STATEMENT OF BASIS AND PURPOSE

This decision document presents the selected remedial action for the Powell Road Landfill in Huber Heights, Ohio, which was chosen in accordance with the Comprehensive, Environmental, Response, Compensation and Liability Act (CERCLA), as amended by Superfund Amendments and Reauthorization Act (SARA), and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This decision is based on the administrative record for this Site.

The State of Ohio concurs with the selected remedial action.

ASSESSMENT OF THE SITE

Actual or threatened releases of hazardous substances from this Site, if not addressed by implementing the remedial action selected in this Record of Decision (ROD), may present an imminent and substantial endangerment to public health, welfare, or the environment.

DESCRIPTION OF THE SELECTED REMEDIAL ACTION

The remedial action will be a final site-wide remedy. The selected remedial action addresses the sources of the contamination by containment of the landfill and contaminated soils and treatment of leachate and ground water. The major components of the selected remedial action for the Powell Road Landfill are:

- institutional controls
- improved landfill cap with liner
- excavation of contaminated soils
- consolidation of soils under landfill cap
- ground water monitoring
- flood protection
- storm water controls
- active landfill gas collection with flare
- leachate extraction
- on-site leachate treatment
- extraction of ground water from the shallow aquifer adjacent to the landfill
- on-site ground water treatment
- discharge of treated ground water and leachate to river

The selected remedial action will address the principal threats posed by the Site.

STATUTORY DETERMINATIONS

The selected remedial action is protective of human health and the environment, complies with Federal and State requirements that are legally applicable or relevant and appropriate to the remedial action, and is cost effective. The remedial action utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable, and satisfies the statutory preference for remedies that employ treatment that reduces toxicity, mobility, or volume as a principal element.

Because this remedial action will result in hazardous substances remaining on-site, a review will be conducted within five years after commencement of remedial action to insure that the remedial action continues to provide adequate protection of human health and the environment.

TABLE OF CONTENTS

RECORD OF DECISION
POWELL ROAD LANDFILL

DECISION SUMMARY

POWELL ROAD LANDFILL
HUBER HEIGHTS, OHIO

I. SITE NAME, LOCATION AND DESCRIPTION

The Powell Road Landfill Superfund Site (the Site) is located in Huber Heights, Ohio, a suburb in the northern Dayton metropolitan area of Montgomery County, Ohio. The Site occupies approximately 70 acres on the floodplain of the Great Miami River (see Figure 1). The landfill portion of the Site is located at 4060 Powell Road in Huber Heights, Ohio, and is bordered by Powell Road and residential housing on the north, an intermittent stream to the east, wooded areas to the south and west, and the Great Miami River to the south. The landfill covers roughly 36.3 acres and rises 30 to 40 feet above the surrounding terrain. The nearest residents live in homes owned by the current owner of the landfill. The homes are located approximately 200 feet north of the landfill along Powell Road. A residential area, known as Eldorado Plat, is located south of the landfill in an area immediately south of the Great Miami River.

The Great Miami River flows west to east along the southern boundary of the Site, approximately 150 feet south of the landfill. Two intermittent streams (Stream A and Stream B) to the east of the Site drain south to the river. The Great Miami River is classified as a warm water habitat (OAC 37451-21) and is used for agricultural, industrial and primary contact (i.e. wading) purposes.

Geologic materials in the area of the Site are outwash deposits (sand, sand and gravel, and silty sand and gravel), till (unsorted sand, clay, silt and gravel), lacustrine deposits (thin layers of clay, silt and very fine sand) and bedrock (see Figure 3). The outwash deposits constitute the regional aquifer known as the Great Miami River buried valley aquifer (GMR BVA) which has been designated a sole-source aquifer under U.S. EPA's Safe Drinking Water Act (SDWA).

The GMR BVA is locally divided into shallow and primary aquifers. Separation of the two aquifers by confining till deposits occurs under the southern portion of the landfill and under the river. (Hereinafter, these two locally separated aquifers are identified as the shallow aquifer adjacent to the landfill and the primary aquifer adjacent to the landfill.) The confining till deposits are also present south of the river (Eldorado Plat area), however, they are not continuous, therefore only one interconnected aquifer exists in this area. (Hereinafter, the aquifer south of the river (Eldorado Plat area) is identified as the primary aquifer.) Figure 2 identifies the location ofhydrogeologic cross-section traces. Figure 3 identifies cross-sections C-C' (north-south) and J-J' (east-west, Eldorado Plat area) and labels the above-discussed local aquifers.

The GMR BVA is the main source of water supply to the Dayton metropolitan area. Residents located south of the Site, in the area immediately south of the river known as Eldorado Plat, obtain their water from private wells installed in the primary aquifer. Approximately 0.75 miles south of the Site are Ohio Suburban Water Company (OSWC) wells, which supply water to residents in most of Huber Heights and a small portion of Mad River Township. Approximately 1.5 miles south of the Site, the City of Dayton operates wells in the GMR BVA. These wells supply water to residents of Dayton, a number of other local municipalities, and Montgomery County. Approximately 0.5 miles west of the Site the city of Dayton has begun operation of a new well field.

II. SITE HISTORY AND ENFORCEMENT ACTIONS

A. SITE HISTORY

The Site is a former gravel pit which was converted to a landfill in 1959 and operated until 1984 under several different owners. The current owner is SCA Services of Ohio, a subsidiary of Waste Management of North America, Inc. Commercial, industrial, and non-hazardous domestic wastes were disposed of in the landfill. Degradation of these wastes resulted in a release of hazardous substances. It is also believed that improper disposal of certain types of industrial waste have occurred at the landfill, including ink waste, paint sludge, strontium chromate and benzidine. The landfill ceased operation in 1984 and was capped and seeded in 1985.

The Site was proposed for listing on the National Priorities List (NPL) on September 8, 1983 and was final on the NPL on September 21, 1984.

In December, 1984, after identifying contamination in the ground water in the area of the Site, the Ohio EPA requested U.S. EPA's support to determine if an imminent and substantial endangerment to human health or the environment existed. U.S. EPA's Technical Assistance Team (TAT) sampled 46 private residential wells. Sampling results identified low levels of VOCs in 6 residential wells. After reviewing these sampling results, U.S. EPA determined that an imminent and substantial risk to human health and the environment was not present at that time, and emergency actions were not required at that time. However, the U.S. EPA recommended that several activities be conducted in the area, which included conducting a detailed Remedial Investigation of the Powell Road Landfill (see Section V.).

B. ENFORCEMENT ACTIVITIES

In April, 1986, negotiations began for a 106 Administrative Order on Consent (AOC) under which Potentially Responsible Parties (PRPs) would perform the Remedial Investigation/Feasibility Study (RI/FS) at the Site. These negotiations terminated in May, 1986, and U.S. EPA began performance of the RI/FS at the Site.

During June of 1987, one PRP, SCA Services of Ohio, Incorporated, contacted U.S. EPA and expressed interest in taking over performance of the RI/FS. On November 12, 1987, an AOC was entered into between the U.S. EPA, the Ohio EPA, and SCA Services of Ohio, Incorporated (SCA) (currently a subsidiary of Waste Management of North America, Inc.). This AOC requires SCA to meet a number of requirements, including conducting an RI/FS and paying all past costs associated with the Site. The final RI report was approved in March of 1992 and the FS was approved in March of 1993.

Initial PRP search activities at this Site identified seven (7) PRPs. General Notices of Potential Liability and CERCLA Section 104(e) Information Requests were issued to all seven (7) PRPs on December 2, 1985. Since 1985, U.S. EPA has issued 232 Information Request and 83 follow-up Information Requests. General Notice letters were sent to thirty-seven (37) PRPs in May, 1993.

Additional future Information Requests and follow-up Information Requests will be issued as appropriate. All PRP information which has been gathered to date is being reviewed. Special Notice letters inviting participation in RD/RA negotiations are expected to be issued to appropriate PRPs by U.S. EPA in the near future.

III. COMMUNITY PARTICIPATION

The public participation requirements of CERCLA sections 113(k)(2)(B)(i-v) and 117 were met in the remedial action selection process by the following:

- A Proposed Plan was finalized and released to the public on May 13, 1993;

- The public was able to comment on the Proposed Plan during a public comment period which started on May 20, 1993 and ended on July 9, 1993 (extended 21 days from original date of June 18, 1993); and

- The public also had the opportunity to participate in a Proposed Plan public meeting held Wednesday, June 2, 1993, in Huber Heights, Ohio. - An informational letter was sent to all parties on the mailing list on August 23, 1993. The letter discussed residential well sampling which has been conducted at the Site from 1984 to present and the results of the sampling.

Public interest at the Site has been high since the RI began. In August, 1989 a Technical Assistance Grant was awarded to the Miami Valley Landfill Coalition (MVLC), a local citizen's group. During the RI, MVLC reviewed numerous documents and met with the U.S. EPA and Ohio EPA on several occasions to discuss documents, present their ideas on additional field work, and their interpretations of RI data. MVLC also commented on technologies identified in the FS, and the proposed remedial action presented in the Proposed Plan.

In 1989, when the RI was close to completion, MVLC concerns, which reflect community concerns in general, were a major factor in the U.S. EPA's and Ohio EPA's decision to install and sample additional monitoring wells and resample select existing monitoring and residential wells again. MVLC was concerned that the connection between the Site and ground water contamination identified approximately 4,000 feet south of the landfill, in the Needmore Road area, had been missed. Installation of new monitoring wells was planned specifically with the intent of confirming the existence of any connection. Despite this additional round of sampling, a connection between the Site and the Needmore Road ground water contamination was not identified.

Public comments, verbal and written, received at the public meeting on the Proposed Plan and during the public comment period along with supporting documents, and response to significant comments, are contained in the Responsiveness Summary attached to this ROD.

IV. SCOPE AND ROLE OF RESPONSE ACTION

The selected remedial action will address the principal threats in contaminated media identified at the Site. These principal threats are landfill gases, contaminated ground water, landfill liquids (leachate) and contaminated soils. The landfill will be covered by an improved landfill cap with a liner which will prevent uncontrolled migration of landfill gases into the air, and prevent infiltration of precipitation into the landfill, thereby reducing the generation of leachate and also reducing the percolation of leachate from the landfill into ground water.

Landfill gases will be actively collected with extraction wells and thermally-treated on site with a flare.

Ground water contamination was identified in the primary and shallow aquifers adjacent to the landfill and in the primary aquifer south of the river (Eldorado Plat area). The selected remedial action will address ground water contamination by extracting ground water from the shallow aquifer adjacent to the landfill, treating ground water on-site, and discharging treated ground water to the Great Miami River in compliance with NPDES permit requirements.

Leachate is present in the landfill and is a source of ground water contamination adjacent to the Site. Leachate will be extracted from the landfill, treated on-site, and discharged to the Great Miami River in compliance with NPDES permit requirements.

Contaminated soils will be excavated and consolidated on the landfill prior to construction of the landfill cap.

The geology of the Site indicates that ground water contamination identified in the shallow aquifer, adjacent to the landfill, could migrate under the Great Miami River and is a possible source of ground water contamination identified in monitoring wells south of the river (Eldorado Plat area). By extracting and treating leachate from the landfill, and ground water in the shallow aquifer adjacent to the landfill, the two sources of ground water contamination identified in the primary aquifer adjacent to the landfill and south of the river (Eldorado Plat area), will be removed. Once the sources are removed, ground water contamination identified in the primary aquifer adjacent to the landfill and south of the river (Eldorado Plat area), is expected to decrease and meet cleanup levels.

A ground water monitoring network will be established on the Site (around the landfill and south of the river (Eldorado Plat area)). The purpose of ground water monitoring is to: 1) evaluate the effectiveness of the treatment/containment components of the remedy to reduce risks in ground water (primary and shallow aquifers adjacent to the landfill and the primary aquifer south of the river (Eldorado Plat area)); and, 2) monitor for changes in ground water flow and potential migration of contaminated ground water from the Site.

The selected remedial action is expected to be the final response for the Site. Because this remedial action will result in hazardous substances remaining on-site, a review will be conducted within five years after commencement of remedial action to insure that the remedial action continues to provide adequate protection of human health and the environment.

V. SUMMARY OF SITE CHARACTERISTICS

The RI determined the nature and extent of on-site and off-site contamination, and estimated the risks posed by the Site to human health and the environment. The RI Report, finalized in February, 1992, identified the following on-site and off-site contamination:

ON-SITE (contamination associated with the Site)

- Landfill gases consisting of methane with detectable concentrations of volatile organic compounds (VOCs)

- Leachate consisting of VOCs, semivolatile organic compounds, and inorganic compounds

- Surface and near-surface soils which contain semivolatile organics, pesticides, and polychlorinated biphenyls (PCBs).

- Shallow and primary aquifers adjacent to the landfill contain VOCs

- Primary aquifer south of the river (Eldorado Plat area) contains VOCs

OFF-SITE (contamination not associated with the Site)

- Primary aquifer south of the river (Needmore Road area) contains VOCs. A connection between the Site and contamination found in this area could not be confirmed and is therefore not addressed by the final remedial action.

A. ON-SITE

The Powell Road Landfill is the source of ground water contamination found in the immediate vicinity of the landfill and is responsible for the generation of landfill gases and leachate. The landfill consists of approximately 2.6 million cubic yards of material.

Landfill gases found in the landfill gas vents and air at the Site consisted mostly of methane with detectable concentrations of volatile organic compounds (VOCs). Figure 4 shows the locations of gas vents and the total VOC concentrations found in the gas vents. Table 1 shows concentrations of methane detected in gas vents and Table 2 shows concentrations of VOCs detected in gas vents.

Thirteen samples of leachate were collected from gas vents in the landfill (Figure 5). Analysis identified VOCs (Table 3), semivolatile compounds (Table 4), metals, and other inorganics (Table 5). Figure 5 shows the leachate/ground water total VOC concentrations at the Site.

One sample of leachate was collected from the landfill surface. Analysis identified VOCs, semivolatile compounds, metals, and other inorganics. Table 6 presents the results of the surface leachate sample analysis.

The chemicals and concentrations found in the surface leachate were essentially the same as the leachate collected from gas vents. Therefore, surface leachate and leachate collected from gas vents are grouped together in further discussions.

Ambient air samples were collected at the Site (Figure 6). Results identified trace amounts of VOCs (Table 7).

Eight sediment samples were collected from surface water bodies on and around the Site (Figure 7). Analysis showed no impact from the landfill in the form of VOCs or inorganic contaminants (Table 8). Several semivolatiles were detected in both upstream and downstream sediment samples.

Surface water samples were collected from the same locations as sediment samples (Figure 7). Analysis showed no impact from the landfill in the form of VOCs, semivolatile compounds, or inorganic contaminants (Table 9). Thirty-two surface soil samples and twelve sub-surface soil samples were collected on the Site and in surrounding areas (Figure 8). Surface and near -surface soils at the Site contain semivolatile organics, pesticides and PCBs at limited locations (Tables 10 and 11). Figure 9 identifies the location and approximate extent of surface and subsurface soils contamination.

Ground water quality was investigated by analyzing water sampled from 44 new and existing monitoring wells (four sampling events) and 30 residential and water supply wells on two occasions.

VOCs were the major contaminant group found in ground water. A total of 15 VOCs were detected in ground water samples collected during the RI.

VOCs were detected in six monitoring wells in the shallow aquifer adjacent to the landfill and in two monitoring wells in the primary aquifer adjacent to the landfill (Table 12).

VOCs were identified in the primary aquifer south of the river (Eldorado Plat area) during the last sampling round (Table 13).

Ground water sample analyses identified that MCLs were exceeded for two VOCs (vinyl chloride and trichloroethene) and two metals (aluminum and beryllium).

Ground water samples obtained during the RI, from residential wells south of the river (Eldorado Plat area) did not identify any contamination. Additional ground water samples of residential wells in the Eldorado Plat area were collected and analyzed in March, 1993. VOCs were detected in one residential well. Similar levels of the same VOCs were found in this well prior to the RI, but were not detected during the RI sampling of the well.

B. OFF-SITE

VOCs were identified in ground water 4,000 feet south of the landfill (Needmore Road area) (Figure 10). The VOCs identified in the Needmore Road area consisted mainly of "ethene" VOCs. The ground water contamination found in the Needmore Road area could not be connected to contamination found on the Site. If the Site were the source of ground water contamination found in the Needmore Road area, ground water contaminants would have been found between the Site and the Needmore Road area. Additionally, dispersion of contaminants caused by migration from the Site to the Needmore Road area would occur, and downgradient contaminants in the Needmore Road area, would be equal-to, or more likely, less-than the ground water contamination found on the Site. However, ground water contamination was not found between the Needmore Road area and the Site, nor were the Needmore Road area ground water contamination levels equal-to or less-than contamination found at the Site. The "ethene" VOC contaminants found in the Needmore Road area were found at levels up to 4-times greater than "ethene" VOCs found in ground water adjacent to the landfill.

However, if in the future a connection is found which identifies PRL as the source of contamination in the Needmore Road area, either a ROD amendment or an Explanation of Significant Differences will be prepared, as appropriate.

VI. SUMMARY OF SITE RISKS

RI data identified the following contaminated media: air, surface and near-surface soils, and ground water. The RI data from each media was evaluated to select chemicals of potential concern (CPCs). CPCs are those chemicals present at the Site most likely to be of concern to human health and the environment. CPCs were selected based on a comparison of contaminants found in each media to background and blank sample data for each media. Table 14 (organics) and Table 15 (inorganics) summarize the CPCs selected for each media. (See RI Report, section 6.2, for tables summarizing RI data for each media and CPCs for each media.)

Based on the results of the RI, U.S. EPA and Ohio EPA directed thePRPs in calculating the risks that the Site would pose to human health and the environment if no remedial actions were taken at the Site. This process is called the Baseline Risk Assessment (Risk Assessment). Risk assessment involves assessing the toxicity, or degree of hazard, posed by the substances found at the Site, and the routes by which humans and the environment could come into contact with these substances.

The primary sources of uncertainty in the preparation of a risk assessment are:

- Environmental sampling and analysis, and selection of chemicals
- Exposure parameter estimation
- Toxicological data

See the RI Report, Section 6.0, for specific information on the Baseline Risk Assessment prepared during the RI/FS.

A. HUMAN HEALTH RISKS

1. Exposure Assessment

Potential pathways by which human populations may be exposed to chemicals at or originating from the Site were identified under both current use and potential future residential land-use conditions. Twelve complete exposure pathways were selected for detailed evaluation under current use conditions. Current use conditions were determined, and are presented, in the RI Report. These pathways are:

- Incidental ingestion of chemicals in surface soil by trespassers on-site,
- Dermal absorption of chemicals in surface soil by trespassers on-site,
- Inhalation of volatile organic chemicals emitted from the landfill by trespassers on-site,
- Inhalation of volatile organic chemicals emitted from the landfill by nearby residents,
- Incidental ingestion of chemicals in intermittent stream A and Great Miami River sediment by nearby residents,
- Dermal absorption of chemicals in intermittent stream A and Great Miami River sediment by nearby residents,
- Incidental ingestion of chemicals in intermittent stream A and Great Miami River (backwater area) surface water by nearby residents,
- Dermal absorption of chemicals in intermittent stream A and Great Miami River (backwater area) surface water by nearby residents,
- Ingestion of fish from the Great Miami River (backwater area) by nearby residents,
- Ingestion of ground water by nearby residents,
- Inhalation of volatile organic chemicals by nearby residents while showering, and
- Dermal absorption of chemicals in ground water while showering by nearby residents.

Six complete exposure pathways were selected for detailed evaluation under potential future residential land-use conditions. Future residential land-use conditions were determined, and are presented, in the RI Report. These pathways are:

- Incidental ingestion of surface soils by a hypothetical on-site resident,
- Dermal absorption of chemicals in surface soils by a hypothetical on-site resident,
- Inhalation of volatile organic chemicals emitted from the landfill by a hypothetical on-site

resident,

- Ingestion of ground water by a hypothetical on-site resident,

- Inhalation of volatile organic chemicals by a hypothetical on-site resident while showering, and

- Dermal absorption of chemicals in ground water while showering by a hypothetical on-site resident.

Representative exposure point concentrations were developed for the CPCs and each media based on RI data. The chronic daily intake (CDI) of each chemical was estimated to assess exposure associated with the selected pathways. (See RI Report, section 6.4, for tables identifying the exposure point concentrations and resulting CDI for each CPC.) The exposures are quantified by estimating the reasonable maximum exposure (RME) associated with pathways of concern. RME is a conservative estimate of potential risk.

2. Toxicity Assessment

Toxicity information was compiled for each chemical of potential concern. Individual chemicals were separated into two categories of chemical toxicity based on whether they exhibited principally noncarcinogenic or carcinogenic effects. Next, the health effects of both categories of chemicals were evaluated. Table 16 presents oral health effects criteria for the chemicals of potential concern. Table 17 presents inhalation health effects criteria for the chemicals of potential concern.

3. Risk Characterization

Potential human health risks for carcinogenic and noncarcinogenic chemicals of potential concern were calculated for each pathway identified under current use and future residential land-use exposures. (See RI Report, section 6.5, for tables identifying chemical-specific carcinogenic and noncarcinogenic risks for current use and future residential land-use exposure pathways.) The Risk Assessment estimates the excess risk, posed by the Site, of getting cancer, over and above the average risk. Cancer risks from various exposure pathways are assumed to be additive. Excess lifetime cancer risks less than $1x10^{-6}$ (one-in-one million) are considered acceptable by U.S. EPA. Excess lifetime cancer risks between $1x10^{-4}$ (one-in-ten thousand to $1x10^{-6}$ require U.S. EPA and Ohio EPA (the Agencies) to decide if remediation is necessary to reduce risks and to what levels cleanup will occur. Excess lifetime cancer risks greater that $1x10^{-4}$ generally require remediation.

For noncarcinogens, potential risks are expressed as a hazard index. A hazard index represents the sum of all ratios of the level of exposure of the contaminants found at the Site to that of contaminants' various reference doses. In general, hazard indices which are less than one are not likely to be associated with any health risks.

Ground water chemical concentrations found in monitoring wells adjacent to the landfill and in the Eldorado Plat area were compared to U.S. EPA drinking water standards (maximum contaminant levels (MCLs)). Three of the 19 chemicals of concern in monitoring wells adjacent to the landfill were detected at concentrations which exceed MCLs. One of the five chemicals of potential concern in the Eldorado Plat monitoring wells exceeded MCLs. See Table 18 for results.

Although RI data does not support a connection between ground water contamination located on the Site and the ground water contamination found in Needmore Road area, U.S. EPA requested risk calculations be performed on ground water data from the Needmore Road area. These risk calculations are included in the RI Report, and will no longer be discussed in this section.

Under current use conditions the excess lifetime cancer risks were within a 10^{-6} to 10^{-4} cancer risk range for the following pathways (Table 19):

- inhalation of landfill gas emissions by nearby residents;

- dermal absorption through contact with Great Miami River surface water by nearby child/teenager residents;

- dermal absorption through contact with Great Miami River surface water by nearby adult residents;

- dermal absorption through contact with Stream A surface water by a nearby adult resident;

- inhalation of volatiles from showering with ground water in the Eldorado Plat area (based on monitoring well data);

- ingestion of ground water in the Eldorado Plat area (based on monitoring well data);

Under current use conditions, the excess lifetime cancer risks exceeded 10[-4] for the following current use pathways:

- ingestion of fish caught from the backwater area of the Great Miami River;

Under current use conditions, the hazard index value was greater than one for the following current use pathways:

- ingestion of fish caught from the backwater area of the Great Miami River;

The current use risks shown in Table 19 have also been summarized across pathways for several potential receptor populations. For the combination of pathways shown in Table 19, the excess lifetime cancer risks exceeded a cancer risk level of 10[-4] and the hazard index value of one for residents who live in the Eldorado Plat area. This receptor population's increased carcinogenic and noncarcinogenic risk is based on the regular ingestion of fish caught from the backwater area of the Great Miami River.

Under future residential land-use conditions the excess lifetime cancer risks were within a 10[-6] to 10[-4] cancer risk range for the following future residential land-use pathways (Table 20):

- Incidental ingestion of on-site surface soil;

- dermal adsorption while showering with on-site ground water (based on leachate data);

- inhalation of landfill gas emissions; and

- ingestion of on-site ground water (based on leachate data).

Under future residential land-use conditions, the excess lifetime cancer risks did not exceed a 10[-4] cancer risk level for any future residential land-use pathways.

Under future residential land-use conditions, the hazard index value was greater than one for the following future residential land-use pathway:

- ingestion of on-site ground water (based on leachate data)

The future residential land-use risks shown in Table 20 have also been summarized across pathways for the hypothetical on-site resident. For this potential receptor, the excess lifetime cancer risks was 10[-4] and the hazard index value was greater than one.

Actual or threatened releases of hazardous substances from this Site, if not addressed by implementing the response action selected in this ROD may present an imminent and substantial endangerment to public health, welfare, or the environment.

B. ECOLOGICAL RISK ASSESSMENT

An ecological assessment was conducted to evaluate the potential risks to non-human receptors associated with the Site. Potential receptors and exposure pathways were evaluated, including the presence of endangered or threatened species in the area. A site survey was conducted during the RI to identify terrestrial and aquatic receptors. The following indicator species and exposure pathways were selected for detailed evaluation: plants exposed to surface soil, soil organisms (earthworms were used as indicator species), and aquatic organisms (fish and aquatic invertebrates) in surface water and sediment of the Great Miami River and intermittent Stream A. Based on available toxicity information [for four inorganic chemicals for plants based on Kebata-Pendias and Pendias (1984) and Adriano (1986) and one inorganic and one organic chemical for earthworms based on Malecki et al. (1982) and van Rhee (1977)], adverse effects to plants and earthworms from exposure to soil are unlikely to occur. Ambient water quality criteria was equaled or exceeded for modeled concentrations of PCBs and DDT in the backwater area of the Great Miami River. Ambient water quality criteria was equaled or exceeded for measured concentrations of mercury in intermittent Stream A. Adverse impacts to most species of fish and aquatic invertebrates are, however, not expected to occur.

The Ohio Department of Natural Resources had no records of rare or endangered species in the area of the Site. The U.S. Fish and Wildlife Service did not have endangered species information specific to the area where the Site is located; however, the Indiana Bat is an endangered species that occurs in numerous counties in Ohio, including Montgomery County, and may be present at the Site.

C. RISK-BASED CLEANUP LEVELS

Based on the above information, risk-based cleanup levels were developed and are listed on Table 21. These cleanup levels were calculated for each individual compound based on a 10[-4] risk and a 10[-6] risk. Risk-based cleanup levels were calculated using U.S. EPA's Risk Assessment Guidance for Superfund, Part B, dated December 1991.

Final cleanup levels for individual contaminants in all media will be chemical-specific ARARs (see Section X.B.1). If multiple contaminants are present in a media, and cleanup of individual contaminants to ARARs result in a cumulative risk in excess of 10[-4] across a media, cleanup levels of contaminants will be risk-based and cumulative across a media to 1x10[-4] or less (Table 21). If chemical-specific ARARs do not exist for contaminants, cleanup levels of contaminants will be risk-based and cumulative across a media to 1x10[-4] or less (Table 21).

Actual or threatened releases of hazardous substances from this Site, if not addressed by implementing the response action selected in this ROD, may present an imminent and substantial endangerment to human health and the environment.

VII. DESCRIPTION OF ALTERNATIVES

A feasibility study was conducted to develop and evaluate remedial alternatives for the Powell Road Landfill. Remedial alternatives were assembled from applicable remedial technology process options and were initially evaluated for effectiveness, implementability and cost. The alternatives meeting these criteria were then evaluated and compared to the nine criteria required by the NCP (See Section VIII.). Treatability studies were not performed during the RI or the FS, and are not anticipated to be a necessary part of implementation of any of the alternatives for this Site. In addition to the remedial alternatives, the NCP requires that a no-action alternative be considered at every Site. The no-action alternative serves primarily as a point of comparison for other alternatives.

Alternative 1
Description: No Action

Estimated Capital Cost:	$0
Estimated Annual O&M Costs:	$0
Estimated Present-Worth Costs:	$0
Estimated Implementation Timeframe:	None

This alternative does not take any action to remediate the Site and does not consist of any treatment components, engineering controls, monitoring, or institutional controls.

Alternative 2
Description: Institutional controls, improved landfill cap with liner, consolidation of contaminated soils under landfill cap, ground water monitoring, flood protection, storm water controls, active gas collection with flare.

The treatment component of this alternative is landfill gas treatment. Landfill gas will be actively collected by gas extraction wells installed in the landfill and treated thermally on-site via a flare. The estimated volume of landfill gases to be treated is 850 cubic feet/minute (cfm).

The containment component is capping the landfill with an improved landfill cap with liner in accordance with Ohio EPA Solid Waste Management Regulations (OAC-3745-27-11(G)). The landfill cap will prevent migration of contaminated soils into surface water, reduce infiltration of precipitation into the landfill thereby reducing generation of leachate and also reducing the percolation of leachate from the landfill into ground water.

Ground water contamination and leachate are not addressed in this alternative.

The preliminary screening of alternatives indicated that Alternative 2 does not provide overall protection of human health and the environment, therefore, Alternative 2 was screened out of the detailed analysis of alternatives (see Feasibility Study for details). Costs were not developed for Alternative 2.

Common Components
Alternatives 3, 4, 5, 6, and 7, described below, include the following common components:

1. Institutional Controls
Institutional controls include fencing, deed restrictions, and warning signs. Site access will be controlled by an 8-foot chain-link fence topped with barbed wire. Warning signs will be posted to discourage unauthorized entry onto the Site. Deed restrictions will prohibit disturbance of the Site and preclude future development of the Site.

2. Flood Protection
Erosion control measures will be implemented during and after construction to ensure the reduction of flood water velocity during future flooding.

3. Storm Water Controls
Storm water control measures will be implemented and may consist of runoff control berms and rip-rap-lined discharge ditches.

4. Improved Landfill Cap with Liner
An improved landfill cap with liner will be constructed over the landfill in accordance with the Ohio EPA's Solid Waste Management Regulations. The landfill consists of approximately 2.6 million cubic yards of material. The landfill cap will prevent migration of contaminated soils into surface water, reduce infiltration of precipitation into the landfill thereby reducing generation of leachate and also reducing the percolation of leachate from the landfill into ground water.

5. Ground Water Monitoring
A ground water monitoring network will be established on the Site (around the landfill and south of the river (Eldorado Plat area)). Existing monitoring wells, new monitoring wells, and select residential wells may be used to monitor upgradient and downgradient ground water conditions. Ground water monitoring will serve two purposes: 1) evaluate the effectiveness of the treatment/containment components of the remedy to reduce risks in ground water (shallow and primary aquifers adjacent to the landfill and the primary aquifer south of the river (Eldorado Plat area)); and, 2) monitor for changes in ground water flow and potential migration of contaminated ground water from the Site. The specifics of the ground water monitoring system, including frequency and duration, will be determined during the remedial design.

6. Consolidation of Contaminated Soils Under Landfill Cap
Approximately 600 cubic yards of soil contaminated with DDT and/or PCBs will be excavated and consolidated on the top of the landfill and then covered by the landfill cap. The areas currently identified for excavation and consolidation are within approximately 400 feet of the landfill (see Figure 9). The Resource Conservation and Recovery Act (RCRA) land disposal restrictions (LDRs) are not an ARAR for excavation of soils around the landfill and consolidation of the soils under the landfill cap because the soils being removed are from one "area of contamination (AOC)". This AOC consists of the landfill, surrounding contaminated soils, leachate and contaminated ground water. Movement of waste within the AOC does not constitute placement.

7. Active Gas Collection and Treatment with Flare
An estimated 850 cubic feet per minute of landfill gases will be actively collected with gas extraction wells and thermally treated on-site via a flare. The system will be designed to comply with the Clean Air Act, Section 101 and 40 CFR 52.

8. Leachate Extraction
Leachate will be extracted from the landfill at a rate sufficient to create a slight influx of ground water into the landfill and prevent migration of leachate out of the landfill. A series of vertical extraction wells will be installed in the landfill and screened in the permeable water bearing zones. Leachate will be collected by a system of piping buried under the landfill cap and will be temporarily stored in a holding tank prior to treatment. The leachate extraction system may remove up to 50,000 gallons per day (gpd) of leachate from the landfill.

9. Leachate Treatment
The leachate treatment system will be designed to remove volatile organic compounds, semivolatile organic compounds, and metals. The leachate treatment system may consist of a system of biological bulk organic removal and metals removal, with remaining volatile and semi-volatile organic removal by air stripping and activated carbon treatment, respectively. Details of the leachate treatment system will be identified during the remedial design. Leachate will be treated to levels which will allow discharge of effluent to the river under the NPDES permit requirements (see discussion below). The leachate treatment system could remove an estimated 1,100 lbs. total of VOCs from the leachate.

10. Discharge
Treated leachate effluent will be discharged to the Great Miami River. Discharge will comply with all Federal and State of Ohio National Pollutant Discharge Elimination System (NPDES) requirements (40 CFR 122.44, Clean Water Act Section 208, 40 CFR 125, 40 CFR 136, Ohio Revised Code). NPDES requires compliance with state and federal water quality standards, whichever is more stringent, and regulates discharge into surface water.

Alternative 3

Description: Institutional controls, improved landfill cap with liner, consolidation of contaminated soils under landfill cap, ground water monitoring, flood protection, storm water controls, active gas collection with flare, leachate extraction, on-site leachate treatment, discharge to river.

Estimated Capital Cost:	$11,463,000
Estimated Annual O&M Costs:	$ 398,000
Estimated Present-Worth Costs:	$16,820,000
Estimated Implementation Timeframe:	6 years

This alternative consists of all the common elements described above and addresses landfill gas, contaminated soils, and leachate. Existing ground water contamination will not be actively remediated. Ground water monitoring will evaluate the effectiveness of the treatment/containment components of the remedy to reduce risks in ground water.

Final cleanup levels for individual contaminants in each media, ground water, leachate, and air, will be chemical-specific ARARs (see Section X.B.1.). If multiple contaminants are present in a media, and cleanup of individual contaminants to ARARs result in a cumulative risk in excess of 10[4] across a media, cleanup levels of contaminants will be risk-based and cumulative across a media to 1x10[-4] or less (Table 21). If chemical-specific ARARs do not exist for contaminants, cleanup levels of contaminants will be risk-based and cumulative across a media to 1x10[-4] or less (Table 21). The point of compliance for ground water cleanup levels will be at the boundary of the landfill. Ground water cleanup levels shall be achieved at and beyond the landfill boundary. The point of compliance for cleanup levels of landfill gas emissions shall be the fence surrounding the landfill.

Treatment components include landfill gas treatment via flare and leachate treatment. Landfill gases will be actively collected with gas extraction wells and thermally treated on-site via a flare. Leachate will be extracted from the landfill at a rate sufficient to create a slight influx of ground water into the landfill and prevent migration of leachate out of the landfill. A series of vertical extraction wells will be installed in the landfill and screened in the permeable water-bearing zones. Leachate will be collected by a system of piping buried under the landfill cap and will be temporarily stored in a holding tank prior to treatment.

The containment components are consolidation of contaminated soils on top of the landfill, and an improved landfill cap with liner. Contaminated soils will be excavated and consolidated on top of the landfill followed by construction of an improved landfill cap with liner. The landfill cap will comply with Ohio EPA's Solid Waste Management Regulations.

Alternative 4
Description: Institutional controls, improved landfill cap with liner, consolidation of contaminated soils under landfill cap, groundwater monitoring, flood protection, storm water controls, active gas collection with flare, leachate extraction, on-site leachate treatment, extraction of ground water from the shallow aquifer adjacent to the landfill, on-site ground water treatment, discharge to river.

Estimated Capital Cost:	$12,911,000
Estimated Annual O&M Costs:	$ 544,000
Estimated Present-Worth Costs:	$20,510,000
Estimated Implementation Timeframe:	6 years

This alternative consists of all the components of Alternative 3 with the addition of ground water extraction from the shallow aquifer adjacent to the landfill, on-site ground water treatment, and discharge of treated effluent to the river. This alternative addresses landfill gas, contaminated soils, leachate and contaminated ground water in the shallow aquifer adjacent to the landfill. Existing ground water contamination in the primary aquifer, adjacent to the landfill and south of the river (Eldorado Plat area), will not be actively remediated. Ground water monitoring will evaluate the effectiveness of the treatment/containment components of the remedy to reduce risks posed by existing ground water contamination.

Final cleanup levels for individual contaminants in each media are the same as discussed in Alternative 3.

Treatment components include landfill gas treatment via flare and leachate treatment, as discussed in Alternative 3 above, and ground water extraction from the shallow aquifer and ground water treatment on-site. An estimated 400,000 gallons of ground water will be pumped per day from extraction wells in the shallow aquifer adjacent to the landfill, treated on-site, and effluent discharged to the river (in compliance with all NPDES requirements).

The containment components are consolidation of contaminated soils on top of the landfill, and an improved landfill cap with liner, as discussed above in Alternative 3.

Alternative 5
Description: Institutional controls, improved landfill cap with liner, treatment of contaminated soils, consolidation of treated soils under landfill cap, ground water monitoring, flood protection, storm water controls, active gas collection with flare, leachate extraction, on-site leachate treatment, extraction of ground water from the shallow and primary aquifers adjacent to the landfill, on-site ground water treatment, discharge to river.

Estimated Capital Cost:	$13,884,000
Estimated Annual O&M Costs:	$ 618,000
Estimated Present-Worth Costs:	$22,620,000
Estimated Implementation Timeframe:	6 years

This alternative consists of all the components of Alternative 4 with the addition of ground water extraction from the primary aquifer adjacent to the landfill and treatment of contaminated soils prior to placement under the landfill cap. This alternative addresses landfill gas, contaminated soils, leachate, and contaminated ground water in the shallow and primary aquifers adjacent to the landfill. Existing ground water contamination in the primary aquifer south of the river (Eldorado Plat area), will not be actively remediated. Ground water monitoring will evaluate the effectiveness of the treatment/containment components of the remedy to reduce risks in ground water.

Final cleanup levels for individual contaminants in each media are the same as discussed in Alternative 3.

Treatment components include landfill gas treatment via flare, leachate treatment, and ground water treatment, as discussed above in Alternative 4, and treatment of contaminated soils prior to consolidation under the landfill cap. An estimated 600 cubic yards of contaminated soils will be treated to dewater, stabilize and solidify the contaminated soils prior to placement under the landfill cap. This alternative also includes the extraction of ground water from the primary aquifer adjacent to the landfill. An estimated 900,000 gallons of ground water will be pumped per day from extraction wells in the shallow and primary aquifers adjacent to the landfill, treated on-site and effluent discharged to the river (in compliance with all NPDES requirements).

The containment components are consolidation of treated soils on top of the landfill, and an improved landfill cap with liner as discussed above in Alternative 3.

Alternative 6
Description: Institutional controls, improved landfill cap with liner, treatment of contaminated soils, consolidation of treated soils under landfill cap, ground water monitoring, flood protection, storm water controls, active gas collection with flare, leachate extraction, on-site leachate treatment, ground water extraction from the primary aquifer south of the river (Eldorado Plat area), on-site ground water treatment, discharge to river.

Estimated Capital Cost:	$12,600,000
Estimated Annual O&M Costs:	$ 519,000
Estimated Present-Worth Costs:	$19,810,000
Estimated Implementation Timeframe:	8 years

This alternative consists of all the components of Alternative 3 with the addition of ground water extraction from the primary aquifer south of the river (Eldorado Plat area), on-site ground water treatment, discharge of treated effluent to the river, and treatment of contaminated soils prior to consolidation under the landfill cap. This alternative addresses landfill gas, contaminated soils, leachate and contaminated ground water south of the river (Eldorado Plat area). Existing ground water contamination in the shallow and primary aquifers adjacent to the landfill will not be actively remediated. Ground water monitoring will evaluate the effectiveness of the treatment/containment components of the remedy to reduce risks in ground water.

Final cleanup levels for individual contaminants in each media are the same as discussed in Alternative 3.

Treatment components include landfill gas treatment via flare, leachate treatment, ground water treatment, and treatment of contaminated soils prior to consolidation under the landfill cap as discussed above in Alternative 5. The ground water treatment component of this alternative includes the extraction of ground water from the primary aquifer south of the river (Eldorado Plat area). An estimated 250,000 gallons of ground water will be pumped per day from extraction wells in the primary aquifer south of the river (Eldorado Plat area), treated on-site and effluent discharged to the river (in compliance with all NPDES requirements). Ground water extracted from the primary aquifer south of the river (Eldorado Plat area) will be piped across the river for on-site treatment.

The containment components are consolidation of treated soils on top of the landfill, and an improved landfill cap with liner as discussed above in Alternative 3.

Alternative 7
Description: Institutional controls, improved landfill cap with liner, treatment of contaminated soils, consolidation of treated soils under landfill cap, ground water monitoring, flood protection, storm water controls, active gas collection with flare, leachate extraction, on-site leachate treatment, extraction of ground water from the shallow and primary aquifers adjacent to the landfill and from the primary aquifer south of the river (Eldorado Plat area), on-site ground water treatment, discharge to river.

Estimated Capital Cost:	$14,341,000
Estimated Annual O&M Costs:	$ 617,000
Estimated Present-Worth Costs:	$23,060,000
Estimated Implementation Timeframe:	8 years

This alternative consists of all the components of Alternative 5 with the addition of ground water extraction from the primary aquifer south of the river (Eldorado Plat area). This alternative addresses landfill gas, contaminated soils, leachate, contaminated ground water in the shallow and primary aquifers adjacent to the landfill, and contaminated ground water in the primary aquifer south of the river (Eldorado Plat area). Ground water monitoring will evaluate the effectiveness of the treatment/ containment components of the remedy to reduce risks in ground water.

Final cleanup levels for individual contaminants in each media are the same as discussed in Alternative 3.

Treatment components include landfill gas treatment via flare, leachate treatment, ground water treatment, and treatment of contaminated soils prior to consolidation under the landfill cap as discussed above in Alternative 5. This alternative includes the extraction of ground water from the primary aquifer south of the river (Eldorado Plat area). Ground water treatment for this alternative includes extraction of an estimated 1,150,000 gallons of ground water per day from extraction wells in the shallow and primary aquifers adjacent to the landfill, and extraction wells in the primary aquifer south of the river (Eldorado Plat area), on-site treatment and discharge of effluent to the river (in compliance with all NPDES requirements). Ground water extracted from the primary aquifer south of the river (Eldorado Plat area) will be piped across the river for on-site treatment.

The containment components are consolidation of treated soils on top of the landfill, and an improved landfill cap with liner as discussed above in Alternative 3.

VIII. SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

The remedial alternatives developed in the FS were evaluated on the basis of the nine evaluation criteria listed below. The advantages and disadvantages of each alternative were then compared to determine which alternative provides the best balance among these nine criteria. The nine evaluation criteria are set forth in the National Contingency Plan (NCP), 40 CFR Part300.430.

THRESHOLD CRITERIA:

1. Overall Protection of Human Health and the Environment

Overall protection of human health and the environment addresses whether a remedial action provides adequate protection of human health and the environment and describes how risks posed through each exposure pathway are eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls.

Alternative 1 does not meet this criteria because it does not take any action to protect human health and the environment and does not eliminate, reduce or control risks.

Alternative 2 does not eliminate, reduce or control risks associated with ground water contamination and leachate migration into ground water. Alternative 2 was determined not to be protective of human health and the environment and was screened out from the detailed analysis of alternatives. Alternative 2 will no longer be discussed in this document.

Alternatives 3, 4, 5, 6 and 7 utilize institutional controls to reduce risks posed to trespassers by fencing the Site and posting warning signs, and reduce the risks posed to potential future users of the Site by imposing deed restrictions on the landfill property.

Alternatives 3, 4, 5, 6, and 7 utilize numerous source controls: landfill cap; landfill gas collection and treatment; leachate collection and treatment; and consolidation of soils under landfill cap. The risks posed by inhalation of landfill gases are reduced by collecting and treating landfill gases. The risks posed by contaminated ground water will be reduced by extracting and treating leachate from the landfill, the source of ground water contamination. The landfill cap will reduce ground water risks by reducing infiltration of precipitation into the landfill, thereby reducing generation of leachate, and also reducing the percolation of leachate from the landfill into ground water. The risks posed by ingestion of fish are based on the potential migration of contaminated soils into surface water and sediment. These risks will be controlled and reduced by excavating and consolidating contaminated soils under the landfill cap. Alternatives 5, 6 and 7 also provide additional reduction of these risks by treating contaminated soils on-site to dewater, stabilize and solidify the soils prior to consolidation under the landfill cap.

Alternative 3 does not utilize treatment to actively reduce risks associated with existing ground water contamination. Several components of this alternative, however, will interact to address and decrease ground water contamination and achieve cleanup levels. The landfill cap will reduce infiltration of precipitation into the landfill, thereby reducing generation of leachate, and also reducing the percolation of leachate from the landfill into ground water. Leachate in the landfill and ground water in the shallow aquifer adjacent to the landfill are the primary sources of ground water contamination identified in the primary aquifer adjacent to the landfill and south of the river (Eldorado Plat area). Extraction and treatment of leachate from the landfill will address one of the primary sources of ground water contamination and risks associated with ground water contamination. Once the landfill cap is constructed and the landfill gas and leachate extraction/treatment systems are operational, a minimum of 6 years will be required to decrease ground water contamination and achieve ground water cleanup levels in the shallow and primary aquifers adjacent to the landfill and the primary aquifer south of the river (Eldorado Plat area). Ground water monitoring will serve two purposes: 1) evaluate the effectiveness of the treatment/containment components of the remedy to reduce risks in ground water (shallow and primary aquifers adjacent to the landfill and the primary aquifer south of the river (Eldorado Plat area)); and, 2) monitor for changes in ground water flow and potential migration of contaminated ground water from the Site.

Alternatives 4, 5, 6 and 7 utilize ground water treatment technologies to further reduce risks posed by existing ground water contamination.

Alternative 4 reduces risks associated with ground water contamination by extracting and treating ground water from the shallow aquifer adjacent to the landfill. Existing ground water contamination in the primary aquifer, adjacent to the landfill and south of the river (Eldorado Plat area), will not be actively remediated. Several components of this alternative, however, will interact to address and decrease ground water contamination and achieve cleanup levels. The landfill cap will reduce infiltration of precipitation into the landfill, thereby reducing generation of leachate, and also reducing the percolation of leachate from the landfill into ground water. Leachate and ground water in the shallow aquifer adjacent to the landfill are the primary sources of ground water contamination identified in the primary aquifer, adjacent to the landfill and south of the river (Eldorado Plat area). Extraction and treatment of leachate from the landfill and ground water from the shallow aquifer adjacent to the landfill will address the primary sources of ground water contamination and risks posed by ground water contamination in the shallow aquifer (adjacent to the landfill). Once the landfill cap is constructed and the landfill gas, leachate, and ground water extraction/treatment systems are operational, a minimum of 6 years will be required to decrease ground water contamination and achieve ground water cleanup levels in the shallow and primary aquifers adjacent to the landfill and the primary aquifer south of the river (Eldorado Plat area). Groundwater monitoring will serve two purposes: 1) evaluate the effectiveness of the treatment/containment components of the remedy to reduce risks in ground water (shallow and primary aquifers adjacent to the landfill and the primary aquifer south of the river (Eldorado Plat area)); and, 2) monitor for changes in ground water flow and potential migration of contaminated ground water from the Site. Alternative 5 reduces risks associated with ground water contamination by extracting and treating ground water in the shallow and primary aquifers adjacent to the landfill. Existing ground water contamination in the primary aquifer south of the river (Eldorado Plat area) will not be actively remediated. Several components of this alternative, however, will interact to address and decrease ground water contamination and achieve cleanup levels. The landfill cap will reduce infiltration of precipitation into the landfill, thereby reducing generation of leachate, and also reducing the percolation of leachate from the landfill into ground water. Leachate and ground water in the shallow aquifer adjacent to the landfill are the primary sources of ground water contamination identified in the primary aquifer, adjacent to the landfill and south of the river (Eldorado Plat area). Extraction and treatment of leachate from the landfill and ground water from the shallow and primary aquifers adjacent to the landfill will address the primary sources of ground water contamination and risks posed by ground water contamination in the shallow aquifer (adjacent to the landfill). Once the landfill cap is constructed and the landfill gas, leachate, and ground water extraction/treatment systems are operational, a minimum of 6 years will be required to decrease ground water contamination and achieve ground water cleanup levels in the shallow and primary aquifers adjacent to the landfill and the primary aquifer south of the river (Eldorado Plat area). Ground water monitoring will serve two purposes: 1) evaluate the effectiveness of the treatment/containment components of the remedy to reduce risks in ground water (shallow and primary aquifers adjacent to the landfill and the primary aquifer south of the river (Eldorado Plat area)); and, 2) monitor for changes in ground water flow and potential migration of contaminated ground water from the Site.

Alternative 6 reduces risks associated with ground water contamination by extracting ground water from the primary aquifer south of the river (Eldorado Plat area) and treating ground water on-site. Existing ground water contamination adjacent to the landfill, in the shallow and primary aquifers, will not be actively remediated. Several components of this alternative, however, will interact to address and decrease ground water contamination and achieve cleanup levels. The landfill cap will reduce infiltration of precipitation into the landfill, thereby reducing generation of leachate, and also reducing the percolation of leachate from the landfill into ground water. Leachate and ground water in the shallow aquifer adjacent to the landfill are the primary sources of ground water contamination identified in the primary aquifer, adjacent to the landfill and south of the river (Eldorado Plat area). Extraction and treatment of leachate from the landfill will address the one of the primary sources of ground water contamination and risks posed by ground water contamination in the shallow aquifer (adjacent to the landfill). Once the landfill cap is constructed and the landfill gas, leachate, and ground water extraction/treatment systems are operational, a minimum of 8 years will be required to decrease ground water contamination and achieve ground water cleanup levels in the shallow and primary aquifers adjacent to the landfill and in the primary aquifer south of the river (Eldorado Plat area). Ground water monitoring will serve two purposes: 1) evaluate the effectiveness of the treatment/containment components of the remedy to reduce risks in ground water (shallow and primary aquifers adjacent to the landfill and the primary aquifer south of the river (Eldorado Plat area)); and, 2) monitor for changes in ground water flow and potential migration of contaminated ground water from the Site.

Alternative 7 reduces risks associated with ground water contamination by extracting ground water, in the shallow and primary aquifers adjacent to the landfill and the primary aquifer south of the river (Eldorado Plat area), and treating ground water on-site. Leachate and ground water in the shallow aquifer adjacent to the landfill are the primary sources of ground water contamination identified in the primary aquifer, adjacent to the landfill and south of the river (Eldorado Plat area). Extraction and treatment of leachate from the landfill and ground water from the shallow and primary aquifers adjacent to the landfill and the primary aquifer south of the river (Eldorado Plat area) will address the primary source of ground water contamination and risks posed by ground water contamination in the shallow aquifer (adjacent to the landfill). Once the landfill cap is constructed and the landfill gas, leachate, and ground water extraction/treatment systems are operational, a minimum of 8 years will be required to decrease ground water contamination and achieve ground water cleanup levels in the shallow and primary aquifers adjacent to the landfill and the primary aquifer south of the river (Eldorado Plat area). Ground water monitoring will serve two purposes: 1) evaluate the effectiveness of the treatment/containment components of the remedy to reduce risks in ground water (shallow and primary aquifers adjacent to the landfill and the primary aquifer south of the river (Eldorado Plat area)); and, 2) monitor for changes in ground water flow and potential migration of contaminated ground water from the Site.

2. Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)

Applicable requirements are those cleanup standards of control, and other substantive requirements, criteria, or limitations promulgated under Federal or State environmental or facility siting law that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site. Relevant and appropriate requirements are those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under Federal or State environmental siting law that, while not "applicable" to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site, address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well suited to this particular Site.

Compliance with ARARs addresses whether a remedial action will meet all requirements of federal and state environmental laws and regulations and/or provide a basis for a waiver from any of these laws. Federal and State ARARs are divided into three categories: chemical-specific, action specific, and location-specific.

Chemical-Specific ARARs

Federal: Table 22 identifies the federal chemical-specific ARARs. The ground water cleanup levels for Alternatives 3, 4, 5, 6, and 7 will comply with the Safe Drinking Water Act (SDWA) (Note: only non-zero SDWA levels are potential ARARs) and RCRA ground water ARARs by treating leachate and/or ground water treatment. Ground water monitoring will continue until contamination decreases and cleanup levels are achieved. Alternative 3 will rely on treatment/containment components of the remedy to decrease ground water contamination and achieve cleanup levels in ground water adjacent to the landfill (shallow and primary aquifers) and south of the river (Eldorado Plat area) (primary aquifer). Alternative 4 will treat ground water extracted from the shallow aquifer adjacent to the landfill and rely on treatment/containment components of the remedy to decrease ground water contamination and achieve cleanup levels in ground water in the primary aquifer adjacent to the landfill and the primary aquifer south of the river (Eldorado Plat area). Alternative 5 will treat ground water extracted from the shallow and primary aquifers adjacent to the landfill and rely on treatment/containment components of the remedy to decrease ground water contamination and achieve cleanup levels in the primary aquifer south of the river (Eldorado Plat area). Alternative 6 will treat ground water extracted from the primary aquifer south of the river (Eldorado Plat area) and rely on treatment/containment components of the remedy to decrease ground water contamination and achieve cleanup levels in the shallow and primary aquifers adjacent to the landfill. Alternative 7 will treat ground water extracted from the shallow and primary aquifers adjacent to the landfill and the primary aquifer south of the river (Eldorado Plat area) to achieve ground water cleanup levels.

State of Ohio: Table 23 identifies the State of Ohio chemical specific ARARs. Surface water standards will be met by Alternatives 3, 4, 5, 6, and 7 by consolidation of contaminated soils under the landfill cap (Alternatives 3 and 4) or treatment and consolidation of contaminated soils under the landfill cap (Alternatives 5, 6, and 7), thereby reducing the potential of migration of contaminated soils into surface water.

Location-Specific ARARs

Table 24 identifies the State of Ohio location-specific ARARs. Federal location-specific ARARs are discussed in Section X. All alternatives, except Alternative 1, will meet location-specific ARARs. Location specific ARARs include RCRA requirements for a site in a 100-year floodplain, minimizing adverse impacts on a wetland, and minimizing potential harm to and restoration of the floodplain.

Action-Specific ARARs

Federal action-specific ARARs are discussed in Section X. State of Ohio action-specific ARARs are identified on Table 25. All the Alternatives will comply with the Federal and State of Ohio (Ohio Revised Code (ORC) and Ohio Administrative Code (OAC)) action-specific ARARs. These ARARs include: Clean Water Act, OAC, and ORC requirements for discharge of effluent to a river; Clean Air Act, OAC, and ORC requirements for excavation of soils on-site and gas collection and treatment; ORC and OAC requirements for leachate removal and treatment; and ORC and OAC requirements for ground water monitoring.

PRIMARY BALANCING CRITERIA:

3. Long-term Effectiveness and Permanence

Long-term effectiveness and permanence refers to expected residual risk and the ability of a remedial action to maintain reliable protection of human health and the environment over time, once cleanup levels have been met.

Alternative 1 does not reduce risks and will not provide long-term effectiveness or permanence.

Alternatives 3, 4, 5, 6, and 7 provide long-term effectiveness and permanence by utilizing source controls (landfill cap, consolidation of soils under landfill cap, landfill gas collection and treatment, leachate extraction and treatment) which will result in a minimal residual risk. The landfill cap is considered to be an effective long-term technology to reduce migration from the landfill, however long-term maintenance will be required. Alternatives 5, 6, and 7 provide a more permanent soils remedial action by treating soils prior to placement under the landfill cap.

Alternatives 3, 4, 5, and 6 rely, to a certain degree, on treatment/containment components of the alternatives to decrease ground water contamination and achieve cleanup levels in ground water. Long term ground water monitoring will be required for alternatives 3, 4, 5, and 6 to: 1) evaluate the effectiveness of the treatment/containment components of the remedy to reduce risks in ground water (shallow and primary aquifers adjacent to the landfill and the primary aquifer south of the river (Eldorado Plat area)); and, 2) monitor for changes in ground water flow and potential migration of contaminated ground water from the Site. Long-term ground water monitoring will be required for alternative 7 to monitor for changes in ground water flow and potential migration of contaminated ground water from the Site.

4. Reduction of Toxicity, Mobility, or Volume Through Treatment

Reduction of toxicity, mobility, or volume through treatment refers to an assessment of the degree to which a remedial action utilizes treatment to address the principal threats to human health and the environment at the Site. Details of the treatment systems will be identified during the remedial design.

Alternative 1 provides no treatment and therefore no reduction in contaminant toxicity, mobility, or volume (TMV).

Landfill Gases
Alternatives 3, 4, 5, 6, and 7 reduce toxicity, mobility, and volume of contamination in landfill gases through treatment.

Leachate
Alternatives 3, 4, 5, 6, and 7 reduce toxicity, mobility, and volume of leachate contamination through treatment.

Soils
Alternatives 5, 6 and 7 reduce mobility, but not toxicity or volume, of soil contaminants through treatment prior to consolidation.

Ground Water
Alternative 3 does not utilize treatment to reduce TMV of ground water contamination. Alternatives 4, 5, 6, and 7 reduce TMV of ground water contamination through treatment, but each alternative treats different areas of ground water contamination (shallow and primary aquifers adjacent to the landfill and primary aquifer south of the river (Eldorado Plat area)). Alternative 4 utilizes treatment to reduce TMV of ground water

contamination in the shallow aquifer adjacent to the landfill. Alternative 5 utilizes treatment to reduce TMV of ground water contamination in the shallow and primary aquifers adjacent to the landfill. Both Alternatives 4 and 5 will reduce TMV of ground water contamination in the primary aquifer south of the river (Eldorado Plat area). Alternative 6 utilizes treatment to reduce TMV of ground water contamination in the primary aquifer south of the river (Eldorado Plat area). Alternative 7 utilizes treatment to reduce TMV of ground water in the shallow and primary aquifers adjacent to the landfill and the primary aquifer south of the river (Eldorado Plat area).

5. Short-Term Effectiveness

Addresses the potential adverse effects that implementation of a remedial action may have on human health and the environment, i.e., effects to the community, workers and environment during construction and before cleanup levels are achieved. Time until protection is achieved is also evaluated.

Alternative 1 (the No Action Alternative) poses no potential adverse short-term effects to on-site workers. Alternatives 3, 4, 5, 6, and 7 may pose risks to workers installing landfill gas extraction wells and flares, workers excavating and consolidating contaminated soils, and workers installing the landfill cap. These risks will be negligible once gas extraction wells are installed and operating, contaminated soils are excavated and consolidated, and the cap is installed. Risks may be posed to workers involved with installing institutional controls, flood protection, and storm water controls. Workers involved with routine ground water monitoring may be exposed to contaminated ground water until cleanup levels are reached. Alternatives 5, 6 and 7 may pose risks to workers treating contaminated soils prior to their placement under the landfill cap. Alternatives 3, 4, 5, 6, and 7 may pose risks to workers through direct contact with leachate/ground water while installing leachate extraction wells, ground water extraction wells, and leachate and ground water treatment systems.

These potential adverse effects will be controlled by implementation of engineering controls, through the use of personal protective equipment, and by the implementation of a health and safety plan during construction.

Installation of the landfill gas wells may pose risks to the community. Risks will be minimized by installing the wells during suitable weather conditions.

Alternatives 6 and 7 may pose short-term risks to the residents of Eldorado Plat due to dust and noise generated during drilling and pipeline construction of the off-site ground water extraction well system.

Alternative 1, the No Action Alternative, has no timeframe to achieve protection. Alternatives 3, 4 and 5 should attain cleanup levels in approximately 6 years. Alternatives 6 and 7 should attain cleanup levels in approximately 8 years.

6. Implementability

Implementability addresses the technical and administrative feasibility of a remedial action, including the availability of services and materials.

All alternatives are expected to be technically feasible and administratively implementable. Alternatives 5, 6 and 7 are implementable; however, the soil treatment component to be implemented prior to consolidation under the landfill cap, common to these alternatives, is more complex to administer.

The leachate extraction and treatment system component of Alternatives 3, 4, 5, 6, and 7 is implementable. Alternatives 4, 5, 6 and 7 are more difficult to implement than Alternative 3 due to the installation and operation of the on-site ground water extraction and treatment system. Alternatives 6 and 7 are the most complex alternatives due to the construction of a pipeline crossing the river to transport ground water extracted from the primary aquifer south of the river (Eldorado Plat area), north to the on-site treatment system.

7. Cost

Cost includes estimated capital and operation and maintenance costs for a remedial action, and also is expressed as net present worth cost.

Alternative 1

No Cost

Alternative 3

Estimated Capital Cost:	$11,463,000
Estimated Annual O&M Costs:	$ 398,000
Estimated Present-Worth Costs:	$16,820,000
Estimated Implementation Timeframe:	6 years

Alternative 4

Estimated Capital Cost:	$12,911,000
Estimated Annual O&M Costs:	$ 544,000
Estimated Present-Worth Costs:	$20,510,000
Estimated Implementation Timeframe:	6 years

Alternative 5

Estimated Capital Cost:	$13,884,000
Estimated Annual O&M Costs:	$ 618,000
Estimated Present-Worth Costs:	$22,620,000
Estimated Implementation Timeframe:	6 years

Alternative 6

Estimated Capital Cost:	$12,600,000
Estimated Annual O&M Costs:	$ 519,000
Estimated Present-Worth Costs:	$19,810,000
Estimated Implementation Timeframe:	8 years

Alternative 7

Estimated Capital Cost:	$14,341,000
Estimated Annual O&M Costs:	$ 617,000
Estimated Present-Worth Costs:	$23,060,000
Estimated Implementation Timeframe:	8 years

Alternative 1 does not entail any cost at the present time, but may result in the need for costly remediation in the future. Alternative 7 is estimated to be the most expensive alternative, followed by (from most to least expensive) Alternatives 5, 4, 6, and 3.

MODIFYING CRITERIA:

8. State Acceptance

State acceptance indicates whether, based on its review of the RI/FS and Proposed Plan, the State of Ohio concurs, opposes, or has no comment on the selected remedial action.

The State of Ohio concurs with the selected remedial action.

9. Community Acceptance

Community acceptance addresses the community's acceptance of the preferred alternative presented in the Proposed Plan based on comments received during the public comment period. The Responsiveness Summary, attached to this ROD, contains significant comments received during the public comment period and the Agencies' response to those comment.

IX. SELECTED REMEDIAL ACTION

The U.S. EPA has selected Alternative 4 for the final remediation of the Powell Road Landfill Superfund Site.

Alternative 4 includes:

- institutional controls
- improved landfill cap with liner
- excavation of contaminated soils
- consolidation of contaminated soils under landfill cap
- ground water monitoring
- flood protection
- storm water controls
- active landfill gas collection with flare
- leachate extraction
- on-site leachate treatment
- extraction of ground water from the shallow aquifer adjacent to the landfill
- on-site ground water treatment
- discharge of treated ground water and leachate to river

Estimated Capital Cost:	$12,911,000
Estimated Annual O&M Costs:	$ 544,000
Estimated Present-Worth Costs:	$20,510,000
Estimated Implementation Timeframe:	6 years

Contaminated soils will be consolidated on the landfill and a landfill cap with liner will contain the landfill and contaminated soils. The landfill cap will prevent migration of contaminated soils into surface water, reduce infiltration of precipitation into the landfill thereby reducing generation of leachate and also reducing the percolation of leachate from the landfill into ground water. Leachate will be extracted from the landfill and treated on-site. Ground water will be extracted from the shallow aquifer adjacent to the landfill and treated on-site.

The selected remedy will address the two source areas for ground water contamination at the Site; leachate in the landfill and ground water in the shallow aquifer adjacent to the landfill. The geology of the Site indicates that contamination in the shallow aquifer adjacent to the landfill could migrate under the Great Miami River and this aquifer is a possible source of contamination identified in the primary aquifer adjacent to the landfill and south of the river (Eldorado Plat area). Adjacent to the landfill, the shallow aquifer is separated from the primary aquifer under the southern portion of the landfill and under the river, therefore, leachate in the landfill and ground water contamination in the shallow aquifer adjacent to the landfill are the probable sources of ground water contamination identified in the primary aquifer adjacent to the landfill and south of the river (Eldorado Plat area). The selected remedy will not actively remediate ground water contamination identified in the primary aquifer adjacent to the landfill or ground water contamination identified south of the river (Eldorado Plat area). By extracting and treating leachate from the landfill and ground water from the shallow aquifer, the source of ground water contamination identified in the primary aquifer (adjacent to the landfill and south of the river (Eldorado Plat area) will be reduce and ground water contamination is expected to decrease and cleanup levels will be achieved. Ground water contamination should decrease and achieve cleanup levels in an estimated 6 years.

Ground water monitoring is an essential part of this remedy. A ground water monitoring network will be established on the Site (around the landfill and south of the river (Eldorado Plat area)). Ground water monitoring will serve two purposes: 1) evaluate the effectiveness of the treatment/containment components of the remedy to reduce risks in ground water (shallow and primary aquifers adjacent to the landfill and the primary aquifer south of the river (Eldorado Plat area); and, 2) monitor for changes in ground water flow and potential migration of contaminated ground water from the Site. If ground water monitoring identifies that ground water contamination is not decreasing and cleanup levels are not being achieved, the remedy will be reevaluated. The remedial design will develop the specific details of the ground water monitoring network, including the number and location of wells necessary to monitor ground water. The specifics of the ground water monitoring system, including frequency and duration, will be determined during the remedial design.

Off-site ground water contamination identified in the Needmore Road area during the RI, could not be connected to contamination found on the Site. However, if in the future a connection is found which identifies PRL as the source of contamination in the Needmore Road area, either a ROD amendment or an Explanation of Significant Differences will be prepared, as appropriate.

The remedial design will identify the appropriate number and location of wells to collect/extract landfill gas, leachate, and ground water.

Cleanup levels to be achieved by the selected remedial action will be chemical-specific ARARs (see Section X.B.1.). If multiple contaminants are present in the media (i.e. ground water), and cleanup of individual contaminants to ARARs result in a cumulative risk in excess of10[-4] across a media, cleanup levels of contaminants will be risk-based and cumulative across a media to 1x10[-4] or less (Table 21). If chemical-specific ARARs do not exist for contaminants, cleanup levels of contaminants will be risk-based and cumulative across a media to 1x10[-4] or less (Table 21). The point of compliance for ground water cleanup levels will be the boundary of the landfill. Ground water cleanup levels shall be achieved at and beyond the landfill. The point of compliance for cleanup levels of landfill gas emissions shall be the fence surrounding the landfill area.

The selected remedial action is expected to be the final response for the Site. Because this remedial action will result in hazardous substances remaining on-site, a review will be conducted within five years after commencement of remedial action to insure that the remedial action continues to provide adequate protection of human health and the environment.

X. STATUTORY DETERMINATIONS

The U.S. EPA believes that Alternative 4 meets the threshold criteria and provides the best protection with respect to the criteria used to evaluate the alternatives (National Contingency Plan 40 CFR Part 300.430(f)(5)(ii)(A-F). A. Protection of Human Health and the Environment

Alternative 4 utilizes institutional controls to reduce risks posed to trespassers by fencing the Site and posting warning signs, and reduces the risks posed to potential future users of the Site by imposing deed restrictions on the landfill property.

Numerous source controls are utilized by Alternative 4: landfill cap; landfill gas collection and treatment; leachate extraction and treatment; and excavation and consolidation of contaminated soils under the landfill cap. The risks posed by inhalation of landfill gases are reduced by collecting and treating landfill gases.

The interaction of several components of Alternative 4 will decrease ground water contamination and achieve cleanup levels. The landfill cap will reduce infiltration of precipitation into the landfill, thereby reducing generation of leachate, and also reducing the percolation of leachate from the landfill into ground water. Extraction and treatment of leachate from the landfill and ground water from the shallow aquifer adjacent to the landfill will address the primary sources of ground water contamination and risks posed by ground water contamination in the shallow aquifer (adjacent to the landfill). Leachate and ground water in the shallow aquifer adjacent to the landfill are the primary sources of ground water contamination identified in the primary aquifer adjacent to the landfill and south of the river (Eldorado Plat area). Once the landfill cap is constructed and the landfill gas, leachate, and ground water extraction/treatment systems are operational, a minimum of 6 years will be required to decrease ground water contamination and achieve ground water cleanup levels in the shallow and primary aquifers adjacent to the landfill and in the primary aquifer south of the river (Eldorado Plat area).

The risks posed by ingestion of fish are based on the potential migration of contaminated soils into surface water and sediment. These risks will be controlled and reduced by excavating and consolidating contaminated soils under the landfill cap.

Cleanup levels to be achieved by the selected remedial action will be chemical-specific ARARs (Table 22). If multiple contaminants are present in the media (i.e. ground water), and cleanup of individual contaminants to ARARs result in a cumulative risk in excess of 10[-4] across a media, cleanup levels of contaminants will be risk-based and cumulative across a media to 1x10[-4] or less (Table 21). If chemical-specific ARARs do not exist for contaminants, cleanup levels of contaminants will be risk-based and cumulative across a media to 1x10[-4] or less (Table 21).

Potential adverse short-term risks posed to on-site workers will be controlled by implementation of engineering controls. No cross-media impacts will be caused by implementation of Alternative 4.

B. Compliance with ARARs

Alternative 4 will meet or attain all applicable or relevant and appropriate Federal or State requirements (ARARs) and will be implemented in a manner consistent with those laws. It is important to note that on-site actions are required to comply with ARARs, but must comply only with the substantive parts of the applicable or relevant and appropriate requirement. Offsite actions must comply only with applicable requirements, but must comply fully with both substantive and administrative requirements. For example, at the Powell Road Landfill Site, the discharge to the Great Miami River of extracted ground water and extracted leachate which has been treated will be an off-site discharge, and will therefore be subject to both the substantive and administrative requirements of Federal and State law promulgated pursuant to the Clean Water Act National Pollutant Discharge Elimination System. The chemical specific, location-specific and action-specific ARARs for the selected remedial action for the PRL are identified below.

1. Chemical-Specific ARARs

Chemical specific ARARs regulate the release to the environment of specific substances having certain chemical characteristics. Chemical specific ARARs typically determine the extent of clean-up at a Site. For the PRL site, these are:

a. Federal Chemical-Specific ARARs

Safe Drinking Water Act MCLs and MCLGs - Maximum Contaminant Levels (MCLs) and, to a certain extent, non-zero Maximum Contaminant Level Goals (MCLGs), the Federal Drinking Water Standards promulgated under the Safe Drinking Water Act (SDWA) are applicable to municipal drinking water supplies servicing 25 or more people. MCLGs are relevant and appropriate when the standard is set at a level greater than zero (for non-carcinogens); otherwise, MCLs are relevant and appropriate. At the Powell Road Landfill (PRL) site, MCLs and MCLGs are not applicable, but are relevant and appropriate since the aquifer in which the PRL site is located is a sole-source aquifer for drinking water for the City of Dayton. The point of compliance for the Federal drinking water standards is at the boundary of the landfilled waste and throughout the contaminated ground water plume associated with the PRL site.

Clean Air Act (40 CFR Part 50) - The Clean Air Act requirements include the TSP standard for air discharges. This requirement is applicable to the PRL site because the gas extraction and treatment, leachate treatment, excavation and consolidation of contaminated soils, and various other treatment methods which are part of this remedy are potential sources of fugitive dust, particulate, and/or VOCs.

See Table 22 for a list of additional Federal chemical-specific ARARs.

b. State Chemical-Specific ARARs

See Table 23 for a list of the State of Ohio Chemical-Specific

2. Location-Specific ARARs

Location-specific ARARs are those requirements that relate to the geographic position of the Site. For the PRL site, these are:

a. Federal Location-Specific ARARs

The Clean Water Act Section 404 - This section of the Act regulates the discharge of dredge and fill materials at sites to waters of the United States. These regulations are applicable to the PRL site, since there are wetlands located on the site.

Wetland Management Executive Order 11990 - This order requires federal agencies to avoid, to the extent possible, the long- and short-term adverse impacts associated with the destruction or modification of wetlands. This requirement is applicable to the PRL site since there are wetlands located on the Site.

RCRA location standards 40 CFR Part 264.18 - These standards specify that a facility located in a flood plain must be designed, constructed, operated, and maintained to prevent washout of hazardous wastes by a 100-year flood plain. This requirement is applicable to the PRL site if a hazardous waste management unit is created on-site as a result of air stripping or other onsite treatment, these standards are applicable to the PRL because the site is located in a 100-year flood plain.

Floodplain Management Executive Order 11988 - This order requires minimization of potential harm to or within flood plains and the avoidance of long- and short-term adverse impacts associated with the occupancy and modification of flood plains. This order is applicable to the PRL site since the PRL site is located within a flood plain.

b. State Location-Specific ARARs

See Table 24 for a list of the State of Ohio location-specific ARARs.

3. Action-Specific ARARs

Action-Specific ARARs are requirements that define acceptable treatment and disposal procedures for hazardous substances. For the PRL site, these are:

a. Federal Action-Specific ARARs

RCRA Subtitle C Standards for Owners and Operators of Hazardous Waste Treatment Storage and Disposal Facilities (40 CFR Part 264)

- These requirements govern the owners and operators of hazardous waste treatment storage and disposal facilities. These requirements are applicable to the PRL site if a hazardous waste management unit is created onsite as a result of air stripping or other on-site treatment methods.

Clean Air Act Standards for the Approval and Promulgation of Implementation Plans (40 CFR Part 52) - These requirements govern the approval and promulgation of implementation plans. These requirements are applicable to the PRL site because of various aspects of the remedy for the PRL site including excavation and consolidation of contaminated soils, gas collection and treatment, and the use of several treatments methods at the site.

Toxic Substances Control Act Standards for Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce and Use Prohibitions (40 CFR Part 761) - These requirements govern the manufacturing, processing, distribution in commerce and use prohibitions for polychlorinated biphenyls (PCBs). These requirements will be applicable to the PRL site if additional testing is done of the contaminated soils to be excavated and consolidated as part of the PRL site remedy is done, and the soils are found to exceed a PCB level of 50 parts per million.

Clean Air Act Air Quality and Emission Limitations (Clean Air Act Section 110). These requirements relate to air quality and emission limitations. These requirements are applicable to the PRL site due to various aspects of the remedy for the PRL site including excavation and consolidation of contaminated soils, gas collection and treatment, and the use of several treatment methods at the Site.

b. State Action-Specific ARARs

See Table 25 for a list of the State of Ohio action-specific ARARs.

4. To Be Considered

a. Federal to be Considered

"Control of Air Emissions from Superfund Air Strippers at Superfund Groundwater Sites" (June 15, 1989) (OSWER Directive 9355.0-28) - This guidance indicates that sources that need controls are those with actual emissions rates in excess of 3 lbs/hr, or 15 lbs/day, or a calculated rate of 10 tons/year (T/yr) of total VOCs. This guidance should be considered at the PRL site if one of the treatment methods used as part of the remedy for the PRL site is a ground-water-pump-and-treat technique used together with air strippers, and if the emission rates at the PRL exceed these rates, and since the PRL is located in an ozone non-attainment area.

C. Cost-Effectiveness

The U.S. EPA believes that the selected remedial action is cost effective in mitigating the risks posed by the Site contaminants within a reasonable period of time. Section 300.430(f)(ii)(D) of the NCP requires EPA to evaluate cost-effectiveness by comparing all the alternatives which meet the threshold criteria of protection of human health and the environment against three additional balancing criteria: long-term effectiveness and permanence; reduction of toxicity, mobility or volume through treatment; and short-term effectiveness. The selected remedial action meets these three criteria and provides overall effectiveness in proportion to its cost. The estimated cost for the selected remedial action is $20.5 million, which is a reasonable value for the expected results to be achieved by the selected remedial action.

D. Utilization of permanent solutions and alternate treatment technologies to the maximum extent practicable

U.S. EPA believes that the selected remedial action represents the maximum extent to which permanent solutions and treatment technologies can be utilized in a cost-effective manner to address contamination and risks associated with the Site and potential migration of contaminants away from the Powell Road Landfill. The selected remedial action provides the best balance of tradeoffs in terms of long-term effectiveness or permanence; reduction in toxicity, mobility or volume; short-term effectiveness; implementability; cost; and State and community acceptance.

The criterion of overall protection of human health and the environment and long-term effectiveness and permanence were crucial in the decision to select Alternative 4. Overall protection of human health and the environment was best achieved by the selected remedial action because it provides protection of human health from risks through treatment of leachate and ground water in the shallow aquifer adjacent to the landfill. By treating contamination in leachate and ground water in the shallow aquifer adjacent to the landfill, ground water contamination will decrease, cleanup levels will be achieved, and the continued migration of leachate and contaminated ground water from the shallow aquifer adjacent to the landfill is reduced. Leachate and ground water contamination in the shallow aquifer adjacent to the landfill are the primary sources of ground water contamination identified in the primary aquifer, adjacent to the landfill and south of the river (Eldorado Plat area). Extraction and treatment of leachate from the landfill and ground water from the shallow aquifer adjacent to the landfill will address these sources of ground water contamination and associated risks. Once the landfill cap is constructed and the landfill gas, leachate, and ground water extraction/treatment systems are operational, contamination in the primary aquifer adjacent to the landfill and south of the river, will decrease and achieve cleanup levels.

Long-term effectiveness and permanence was best achieved by the selected remedial action due to leachate and ground water treatment components. Leachate in the landfill and ground water in the shallow aquifer adjacent to the landfill will be extracted and treated to reach cleanup levels and reduce residual risks in ground water. The ground water in the shallow aquifer adjacent to the landfill has the highest ground water risks, and during the breakdown and dispersion of ground water contamination, risks to downgradient well users could exist. Once the landfill cap is constructed and the landfill gas, leachate, and ground water extraction/treatment systems are operational, the source of ground water contamination in the primary aquifer south of the river (Eldorado Plat area) will no longer exist and ground water contamination in the primary aquifer (adjacent to the landfill and south of the river (Eldorado Plat area)) will reduce and achieve cleanup levels (estimated to occur in a minimum of 6 years).

Alternative 7 is the only alternative that actively addresses all areas of ground water contamination associated with the landfill and reduces risks posed by ground water contamination. Ground water contamination in the primary aquifer south of the river (Eldorado Plat area) is addressed in Alternative 7 by extracting ground water from the primary aquifer south of the river (Eldorado Plat area), transporting the extracted ground water across the river via a pipe, to the Site for on-site treatment. This ground water technology was considered too expensive and too complex to implement compared to the minimal reduction of ground water risks. The State of Ohio concurs with the selected remedial action. The community's comments received during the public comment period are summarized in the Responsiveness Summary, attached to this ROD, along with the Agencies' response to comments.

The selected remedial action meets the statutory requirement to utilize permanent solutions and treatment technologies, to the maximum extent practicable.

E. Preference for Treatment

The selected remedial action satisfies the statutory preference for treatment as a principal element. Landfill gases and leachate will be collected/extracted and treated on-site. Ground water will be extracted from the shallow aquifer adjacent to the landfill and treated on-site. Leachate will be extracted from the landfill and treated on-site. The Powell Road Landfill, the source of contamination, will not be treated, but will be contained by a landfill cap.

XI. DOCUMENTATION OF SIGNIFICANT CHANGES

The preferred alternative presented in the Proposed Plan was Alternatives 5. The Record of Decision identifies the selected remedial action as Alternative 4. Because the selected remedial action was one of the alternatives presented in the Proposed Plan, the U.S. EPA was not required to seek additional public comment on a revised Proposed Plan (NCP 40 CFR Part 300.430(F)(3)(ii)(A)). The differences between these two alternatives are the following: 1) Alternative 4 does not include treatment of contaminated soils to dewater, stabilize and solidify the soils (prior to consolidation under the landfill cap), and 2) Alternative 4 does not include extraction of ground water from the primary aquifer adjacent to the landfill.

The preferred alternative presented in the Proposed Plan was modified as a result of comments received during the public comment period. Public comments caused the U.S. EPA and Ohio EPA (the Agencies) to reevaluate the preferred alternative. Several major comments were received during the public comment period which questioned various aspects of the leachate and ground water extraction and treatment components of the preferred alternative. Based on these comments the Agencies consulted technical experts for assistance with the issues. Below is a summary of the comments, followed by the actions the Agencies took to resolve the issues.

Comment 1.
A ground water extraction system could compromise the leachate extraction system, and pull contamination from the leachate/ground water adjacent to the landfill, deeper into the primary aquifer.

Action:
PRL documents were reviewed by the Agencies' technical staff and calculations of estimated drawdown of the ground water table which could be caused by a ground water extraction system were calculated. These calculations estimate conditions under which ground water extraction could have a negative effect on a leachate extraction system.

Drawdown calculations of a ground water extraction system in the shallow aquifer adjacent to the landfill identified minimal drawdown of the water table would occur (<1 foot). Since ground water extraction wells will be located between the southern boundary of the landfill and the river, any possible effects of ground water extraction would influence only the leachate extraction wells closest to the southern boundary of the landfill. Pumping rates of both extraction systems could be adjusted as necessary to prevent any negative interaction of the two extraction systems.

Drawdown calculations of a ground water extraction system in the primary aquifer adjacent to the landfill identified substantial drawdown of the water table may occur (possibly 4 feet). Therefore, extraction of ground water from the primary aquifer adjacent to the landfill could increase downward migration of contamination from the shallow aquifer adjacent to the landfill into the primary aquifer adjacent to the landfill, except where the confining till layer would limit vertical migration.

Therefore, the Agencies partially agree with the commenter. Extracting ground water from the primary aquifer may compromise the leachate extraction system. However, the Agencies believe that it remains necessary to extract and treat ground water from the shallow aquifer adjacent to the landfill to reduce the risks posed by ground water in this aquifer.

Comment 2.
The Proposed Plan's preferred alternative 5 was questioned. The rationale being questioned was that by extracting ground water from the primary aquifer adjacent to the landfill, contamination identified south of the river (Eldorado Plat area), would be reduced. The commenter states that there is no evidence that PRL is the source of contamination found south of the river (Eldorado Plat area).

Action:
This comment caused the Agencies to carefully review the geology of the Site, the ground water contaminants and the migration of ground water away from the Site.

The primary aquifer which underlies the landfill is separated by a confining till layer which is present under the south side of the landfill and under the river. This till layer separates the aquifer into a shallow and primary aquifer. Although the till layer is present south of the river (Eldorado Plat area), it is not continuous and therefore the aquifers are interconnected.

Ground water contamination is found adjacent to the landfill in the shallow aquifer and in the primary aquifer. However, south of the river (Eldorado Plat area), geologic cross-sections do not show a continuous till layer separating the aquifers in the vicinity of the monitoring wells. RI ground water data in the Eldorado Plat area identifies contamination in monitoring wells both above and below the discontinuous till layer.

Ground water sampling and analysis found VOCs in the shallow aquifer adjacent to the landfill (223 ug/L), in the primary aquifer adjacent to the landfill (150 ug/L), and in the primary aquifer south of the river (Eldorado Plat area) (13 ug/L).

VOC contamination identified in the aquifers adjacent to the landfill tend to primarily consist of "ethane" compounds and VOC contamination identified south of the river (Eldorado Plat area) tend to primarily consist of "ethene" compounds. This is the major argument used in the RI to discount the landfill as the source of ground water contamination identified south of the river (Eldorado Plat area). The Agencies disagree with the argument because "ethene" compounds were found in landfill gas vents (PCE, TCE), leachate (DCE), and in the shallow aquifer adjacent to the landfill (DCE). Ethene compounds were not detected in monitoring wells in the primary aquifer adjacent to the landfill.

Migration of contaminants away from the landfill are based on the location of sources of contamination and the geology. The major source is the landfill, which generates leachate, which migrates into the ground water. Although the till layer does not exist directly under the landfill, ground water flow in the regional aquifer (GMR BVA) is horizontal from the north to south, and once leachate migrates into ground water, it migrates horizontally to the south. This is why the shallow aquifer adjacent to the landfill contained the highest levels of contaminants and exceeded MCLs during RI sampling. Some vertical migration of leachate/ground water also carries contamination into the primary aquifer (adjacent to the landfill), however, only 2 monitoringwells in the primary aquifer adjacent to the landfill showed contamination during RI sampling. Due to these area ground water flow patterns at the Site, migration of contaminants from the landfill to south of the river (Eldorado Plat area), must occur horizontally from either the shallow or primary aquifers adjacent to the Site (or possibly from both aquifers).

RI data suggested that the Great Miami River was a barrier to migration of ground water from adjacent to the landfill, under the river to the aquifer in the Eldorado Plat area. Thus, contamination identified in the Eldorado Plat area must have migrated from the primary aquifer adjacent to the landfill. However, in response to public comments the Agencies consulted ground water experts at Ohio EPA and were advised that the Great Miami River is not necessarily a barrier to ground water contaminant migration under the river.

In conclusion, the Agencies believe that the shallow aquifer adjacent to the landfill is one of the primary sources of contamination found in the Eldorado Plat area. As a primary source, remediation of the shallow aquifer adjacent to the landfill will significantly reduce migration of ground water contamination from the Site. This component of the remedial action, combined with leachate extraction and treatment as well as the construction of the landfill cap, is expected to eliminate migration of ground water contamination from the Site.

Comment 3.
Treatment of excavated contaminated soils, prior to consolidation on the landfill, would not provide additional protection nor provide significant reduction of toxicity, mobility or volume, compared to Alternative 4.

Action:
The Agencies have reviewed the information provided by the commenter, and consulted with the Ohio EPA RCRA program, and agree that treatment of soils to dewater, solidify and stabilize soils prior to consolidation under the landfill cap will not provide any additional protection of human health and the environment, nor provide any significant reduction of toxicity, mobility or volume.

State of Ohio Environmental Protection Agency

P.O. Box 1049, 1800 WaterMark Dr.
Columbus, Ohio 43266-0149
(614) 644-3020
FAX (614) 644-2329

September 30, 1993

RE: POWELL ROAD LANDFILL
MONTGOMERY COUNTY, OHIO
RECORD OF DECISION

Mr. Valdus V. Adamkus
Regional Administrator
U.S. EPA, Region V
77 West Jackson Boulevard
Chicago, Illinois 60604

Dear Mr. Adamkus:

The Ohio EPA has received and reviewed the Record of Decision (ROD) for the Powell Road Landfill (PRL) Superfund Site in Montgomery County, Ohio. Ohio EPA concurs with the selection of Alternative 4 for remedial action at this site. The selected remedial action presented in the ROD differs from the preferred remedial alternative outlined in the proposed plan. The selected remedial action, Alternative 4, includes the following components:

- institutional controls;
- improved landfill cap with liner;
- excavation of contaminated soils;
- consolidation of excavated soils under landfill cap;
- ground water monitoring;
- flood protection;
- storm water controls;
- active landfill gas collection with flare;
- leachate extraction;
- on-site leachate treatment;
- extraction of ground water from the shallow aquifer adjacent to the landfill;
- on-site ground water treatment;
- discharge of treated ground water and leachate to the river.

Estimated present worth cost of this remedial action is $20.51 million. Estimated cost of operation and maintenance for this remedial action is $44,000 per year.

Specifics of the remedial action such as the exact number and location of ground water extraction and monitoring wells, leachate extraction wells, and gas extraction wells, as well as the amounts of media to be extracted and treated will be determined in the remedial design. The leachate extraction system will be designed to create a slight influx of ground water into the landfill.

Language in the ROD also indicates that, should a connection ever be found between PRL and the area of contamination known as the Needmore Road plume, either a ROD amendment or an Explanation of Significant Differences will be prepared as appropriate.

Ohio EPA believes that the selected remedial action for Powell Road Landfill provides the best balance among the alternatives when evaluated against the nine criteria set forth in the National Contingency Plan, 40 CFR, Part 300.430.

Sincerely,

Donald R. Schregardus
Director

AFG

Distribution: Jan Carlson, Acting Chief, DERR
Jenifer Kwasniewski, Section Manger, T&PSS, DERR
Catherine Stroup, Legal, Ohio EPA
Amy Gibbons, SWDO, DERR
Jeff Hines, SWDO, DERR
Jan Bartlett, RPM, U.S. EPA
Joe Dufficy, OH/MN Branch, U.S. EPA